naïvely says, "He was sent back to the depot, and made no further complaint of weak sight." The author is not complimentary to his *confrères* when he says that many so-called malingerers are in reality found to be suffering from eye disease which their surgeons have been unable to detect.

The manual is profusely illustrated. Many of the illustrations are excellent, but some are of a fearful and wonderful nature. The frontispiece, representing a section of the anterior hemisphere of the globe of the eye, is, in its way, a masterpiece: the knob-like protuberance on the iris, the wormy ciliary processes, and the aggressively patent posterior aqueous chamber (which is now known to be non-existent as a space) complete a picture which belongs rather to the domain of comedy than to the province of reality.

GENERAL ASTRONOMY.

General Astronomy. By Prof. C. A. Young, Ph.D., LL.D. (Boston, U.S.A., and London: Ginn and Co., 1888.)

PROF. YOUNG is so well known in this country through his researches in solar physics, that he needs no introduction to our readers. The title of his latest work is very comprehensive, but we may at once say that it is not more so than the book itself. Every branch of the subject is touched upon more or less, although no particular branch receives very extended treatment. It is essentially a book for students, "and is meant to supply that amount of information upon the subject which may fairly be expected of every liberally educated person." For an intelligent reading of the book, only the most elementary knowledge of mathematics is necessary, but, as pointed out in the preface, the mental discipline and maturity which usually attend the later years of College life are assumed. The student is warned at the outset that astronomy, notwithstanding its important practical applications, is in the main a subject of intellectual pleasure rather than an economic one.

The general arrangement of subjects is as good as it well can be. Definitions and general considerations come first, then the various instruments are described, and these are followed by the corrections to be applied to instrumental measurements. Succeeding chapters deal with the various phenomena and problems presented by the earth, moon, sun, planets, comets, meteors, nebulæ, and stars. It is not necessary that we should refer in detail to those parts of the book dealing with the "old astronomy." Still, it may be mentioned that the treatment of Kepler's laws and the theory of lunar perturbations is especially good. We may also recommend Art. 253 to the notice of landscape painters who may be in doubt as to the representation of the moon with scientific accuracy. It would be hard to find a better account of this matter than that given by Prof. Young, and it has the great advantage of brevity.

It is in the various departments of astronomical physics that most debatable points arise, and any criticism is naturally directed there. With regard to sun-spots, Secchi's theory, with slight modifications, as previously published in Prof. Young's well-known book on the sun, is regarded as the most probable one. The theory that they are due to falls of cooled materials, however, scarcely receives justice. The objection raised is that it is not in accordance with the distribution of spots in latitude, but Mr. Lockyer has fully explained ("Chemistry of the Sun") how these spot zones may be accounted for by this theory. Obviously, if spots were produced by the fall of meteorites into the sun from any direction whatsoever, and there were no system of regulation, they would be formed all over the surface, and without espect to period. But just such a regulator as is required is to be found in the solar surroundings, and in the system of solar currents, of the existence of which evidence is constantly accumulating. Moreover, by far the greater part of spot-producing material is probably "home-made," consisting of the cool condensed products of the vapours which have been driven out from below. In the face of these explanations, it is difficult to understand why Prof. Young should have dismissed the "downrush" hypothesis with so few words.

Some people find it difficult to believe that a light body like a comet can partake of motion in an orbit just as well as a planet, but these doubters are reminded (p. 407) that a feather falls as freely as a stone in a vacuum, and that this condition holds for space.

The theory that the luminosity of comets is due to collisions between the meteorites of which they are composed appears to find little favour with Prof. Young. He remarks (p. 418) that, "although the *absolute* velocity of the comet is extremely great, the *relative* velocities of its constituent masses, with reference to each other, must be very slight—far too small apparently to account for any considerable rise in temperature or evolution of light in that way." It must not be forgotten, however, that the meteorites must have some relative velocities, owing to the differential attraction of the sun upon the swarm, and that the disturbance thus set up would be increased as the distance from the sun diminished. The number of collisions would therefore vary exactly as the brightness of comets is known to vary, and this argues strongly in favour of the collision theory of luminosity. Prof. Young attempts to get over the difficulty by suggesting (p. 418) that a gas *in the mass* may become sensibly luminous at a much lower temperature than is generally supposed, but this, we fear, is scarcely reconcilable with the kinetic theory of gases.

There is an excellent short account of the zodiacal light on p. 347, but no reference is made to its connection with the aurora, as regards its spectroscopic phenomena and its periodicity. This relation furnishes further important evidence of its meteoritic nature.

Prof. Young has evidently very little sympathy with Mr. Lockyer's new meteoric hypothesis. Only scattered references to it are made, and very little criticism is vouchsafed. The little criticism that there is seems to be based on an imperfect acquaintance with the papers already published. Thus, the collision theory of variable stars is objected to (p. 484) on the ground that it is not consistent with the irregularities in the periods, but Prof. Young is evidently under the impression that this theory limits itself to the case of a single cometic swarm revolving in an orbit round a central swarm, whereas this case was put forward as the simplest possible.

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In the chapter on the classification of stars according to their spectra, both Vogel's and Secchi's classifications are given. Now, Prof. Young admits that these are based on the "doubtful assumption" that stars like Sirius and Vega are the hottest, and he further remarks that it is possible for a red star to be younger than a white one. It scarcely seems consistent, therefore, to omit the new classification suggested by Mr. Lockyer, which is the only one that takes into account the probability of there being bodies with increasing as well as with decreasing temperatures. The latter classification is certainly a very new one, but other parts of the book show that Prof. Young must have been acquainted with it.

One remark of Prof. Young's is worth quoting. After stating that there are two Observatories established solely for the study of solar physics (Potsdam and Meudon), he remarks with characteristic straightforwardness that "There ought to be one in this country (America)."

We know of no other book which is so comprehensive and at the same time so well adapted for the use of those who aim at something more than a mere smattering of astronomical knowledge. For the benefit of those whose time may be too limited to take up everything in the book, those parts which may be most conveniently omitted are printed in small type. The language is clear, and to simplify matters there are over two hundred excellent illustrations. Further, as might be expected from the fact that Prof. Young *teaches* astronomy, the book is not diluted with irrelevant matter.

A. F.

AN INDEX-CATALOGUE.

The Index-Catalogue to the Library of the Surgeon-General's Office, United States Army. Vol. IX. Medicine (Popular)—Nywelt. Pp. 1054. (Washington: Government Printing Press, 1888.)

THE progress of this *magnum opus* seems irresistible. Year by year the volumes reach us with a regularity that implies strength, and a completeness that indicates a more than mechanical accuracy of work. It still remains, so far as we know, unique among printed catalogues in classifying under subject-headings, such as Mercury, Milk, Neuralgia, &c., not only the books, but also the whole of the signed medical articles in the 3500 periodicals which form the medical press of the world, from Pekin to Paris, from Newfoundland to Uruguay. The newspaper articles are still, as they have always been, collected under the subject-title only, and not under the name of the writer also; for, if the latter cross-cataloguing had been adopted, we should have had more than 300,000 cross-entries, which would have necessitated already two more volumes at least as large as the present; but those articles or essays which the authors have thought it worth while to reprint all come under their names as pamphlets, and this is no inconsiderable number.

This volume includes some names which are embarrassingly popular among medical writers. It needs a clear head to deal with a catalogue of the works of 206 authors of the name of Meyer; but when the librarian comes to Müller, he finds 343 different authors awaiting him with much more voluminous works, and he must be thankful for the great variety of Christian names, and that not more than seven besides the great physiologist contented themselves with the plain Johannes. When we notice that the librarian of the most complete professional library in England has not to do with more than eighteen and thirty-seven authors with these surnames respectively, we can form some rough comparison of their relative completeness; and the student must become aware of what a debt he owes to his Transatlantic *confrère*, who has undertaken and carried through the task of collecting and cataloguing the works of the 494 other medical authors of the same names.

In the first forty-six pages of this volume, the immense collection of facts which had been so well grouped in Vol. VIII. under Medicine, is concluded; and the two longest articles left us are those on the Nervous System, and—perhaps not unnaturally—on New York. That on the Nerves and Nervous System (103 pp.) is one of the most valuable to the student, as such a very large proportion of that rapidly-growing part of medical knowledge is embodied not in books so much as in journalistic and pamphlet literature. The strength of the historic feeling still affecting Mr. John S. Billings and his fellow-workers is shown in the great collection of sixteenth and seventeenth century literature that is to be found under such a heading as Medicine (Popular), and many others. It is very rare nowadays to find in a newly-formed collection, dating from about a quarter of a century ago, any such tendency to accumulate the materials for those great works on the history of disease which we are leaving our successors to write. That is a point towards which the strong modern development of historic research, the earnest inquiry into the origin of species of disease is gradually leading us, but even the great work of Hirsch has left us much to learn and teach, a great field for genius in tracing correctly the broad generalizations in the evolution of the morbid tendencies of men. We are a little surprised to notice the complete absence of the works of Conyers Middleton, which contributed considerably to the understanding of Roman medicine; but we have been much more surprised at the almost unimpeachable way the Index-Catalogue has stood firm in our tests on minute points of very trifling general interest.

Now that these first nine volumes have covered the ground as far as the end of the letter N, it is not unlikely that the work may be finished in five more volumes, and that at Christmas 1893 the enthusiastic student of medicine may be able to possess himself of a work not much smaller than the latest edition of the "Encyclopædia Britannica," containing a catalogue of some 150,000 medical authors, and the titles of about 600,000 of their books, pamphlets, and articles that have been got together in a generation, mainly by the untiring energy of Mr. John S. Billings.

A. T. MYERS.

OUR BOOK SHELF.

The Anatomy of Megascolides australis (the Giant Earthworm of Gippsland). By W. B. Spencer. Transactions of the Royal Society of Victoria, Vol. I. Part 1, pp. 1-60, 6 Plates. (Melbourne: Stillwell and Co., 1888.)

THE Royal Society of Victoria, which has hitherto issued only an *octavo* volume of Proceedings each year, will in future publish also Transactions in *quarto*. The present memoir is the first part of this new series; the

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